

Southern California Plug-In Electric Vehicle (PEV) Subregional Deployment

August 1, 2013



Background

- Complements the land use pattern in the RTP/SCS
- Southern CA is a key market for PEVs
- Effort supports SCAG's Economic Recovery and Job Creation Strategy



Regional PEV Infrastructure Planning

■ So Cal PEV Coordinating Council

- SCAQMD
- SCE and public utilities
- Subregions
- Local Governments
- Clean Cities Coalitions
- Universities
- Auto manufacturers
- Charging infrastructure m
- Installers
- And more every day...



Regional PEV Infrastructure Planning

SCAG awarded two grants

- U.S. Department of Energy
 - Statewide application led by SCAQMD
 - Award = \$1 million statewide, \$300,000 for SCAG and Clean Cities Coalitions
 - Goal: Six regional PEV infrastructure plans Completed December 2012
- California Energy Commission
 - Regional application co-led by SCAQMD & SCAG
 - Award = \$200,000
 - Goal: complete two subregional plans in the South Bay and Western Riverside Councils of Government

Regional PEV Infrastructure Planning

- Speaking at forums and workshops
- Holding regular SoCalPEVCC meetings
- Clearinghouse for PEV Readiness Information



Regional PEV Readiness Plan

- Conduct literature review
- Research market forces
- Analyze driver behavioral information
- Develop a Regional Plan for charging infrastructure
- Develop in-depth subregional plans for SBCCOG and WRCOG
- Participate in meetings and workshops

Barriers to PEV Adoption

- Vehicle cost
- Accessibility of Charging Stations
- Workplace charging
- Multi-family dwelling units
- Range anxiety
- Marginal Cost of Energy

Types of Electric Vehicles

Battery Electric Vehicle (BEV)

- Powered exclusively by the electricity from its on-board battery, which replenishes its battery by plugging-in to the grid, or charging
- Sometimes referred to as “pure” EVs
- Nissan LEAF, SMART EV, Fiat 500e, BMW E-ACTIV

Extended Range Electric Vehicle

- Operates as a battery electric vehicle for a certain number of miles
- After the battery has been discharged, a gas engine powers an electric generator for several hundred miles of “extended-range” driving

Plug-in Hybrid Electric Vehicle (PHEV)

- Has a battery that can be charged off board by plugging into the grid and enables it to travel a certain number of miles solely on electricity
- Operates as a hybrid vehicle once electric-only range is exceeded
- Toyota PHEV Prius, Chevy Volt

Fuel Cell Electric Vehicle

- Converts the chemical energy from a fuel (hydrogen) into electricity through a chemical reaction to drive an electric motor.
- Emits only heat and water
- Honda Clarity, Toyota FCEV,

Hybrid Electric Vehicle (Hybrid)

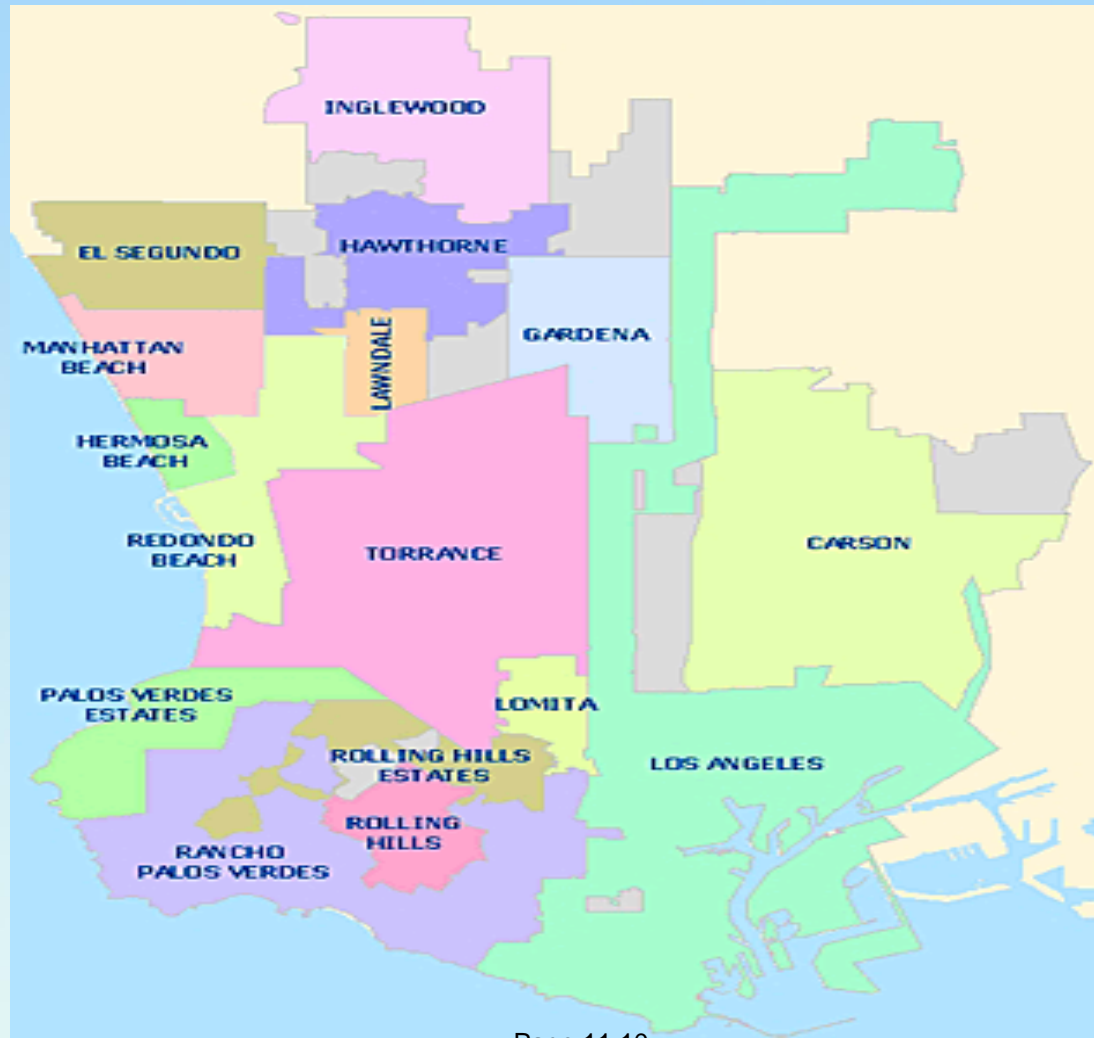
- Uses both electric motor and an internal combustion engine to propel the vehicle
- Toyota Prius, Kia Optima Hybrid, Ford Fusion Hybrid, etc.

SUBREGIONAL PEV PLANNING

Subregional PEV Planning

- How do we identify where charging opportunities are for MUDs, workplace, retail and single family?
- Why?
 - prioritize planning reforms (permit streamlining, zoning, building codes, parking,) by city as well
 - locate demonstration projects on best parcels.
- Example: MUDs and Workplaces South Bay Cities Council of Government Southern California.

South Bay Cities Council of Governments (SBCCOG)

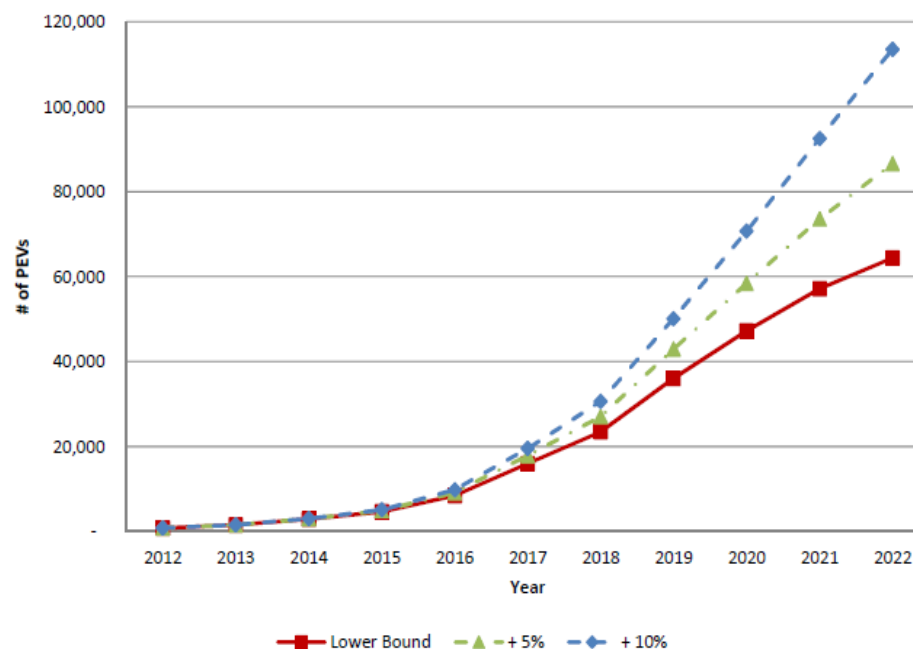


Growth in Plug-in EV Registrations, SBCCOG region

SOUTH BAY CITIES COUNCIL OF GOVERNMENTS

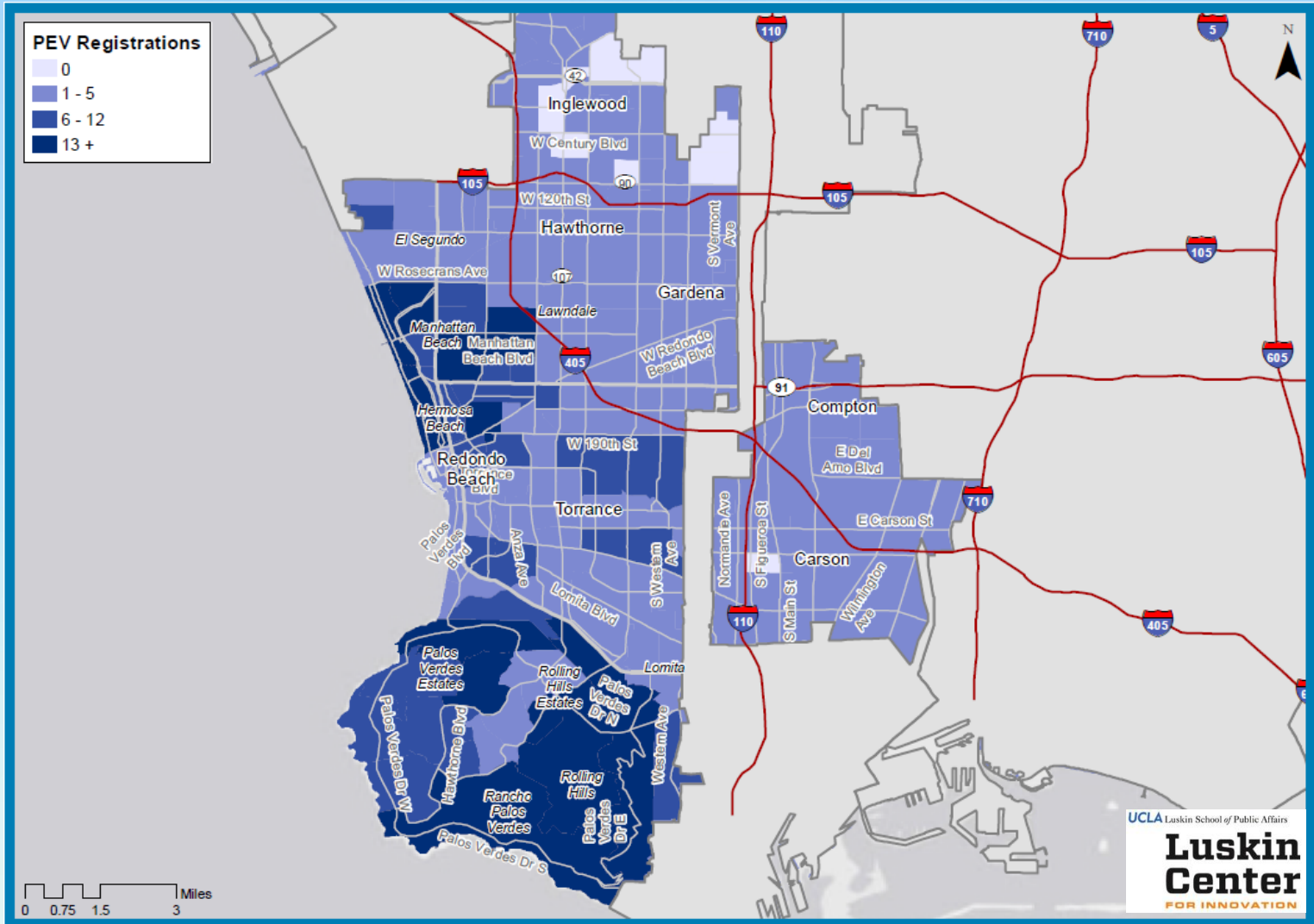
PEV Growth

Year	Cumulative PEV registrations*		
	Lower Bound	+ 5%	+ 10%
2012	747	747	747
2013	1,494	1,494	1,494
2014	2,885	2,960	2,988
2015	4,592	4,859	5,054
2016	8,423	9,155	9,776
2017	15,954	17,799	19,496
2018	23,424	27,023	30,574
2019	36,020	42,906	50,072
2020	47,212	58,382	70,636
2021	57,101	73,530	92,495
2022	64,359	86,552	113,501

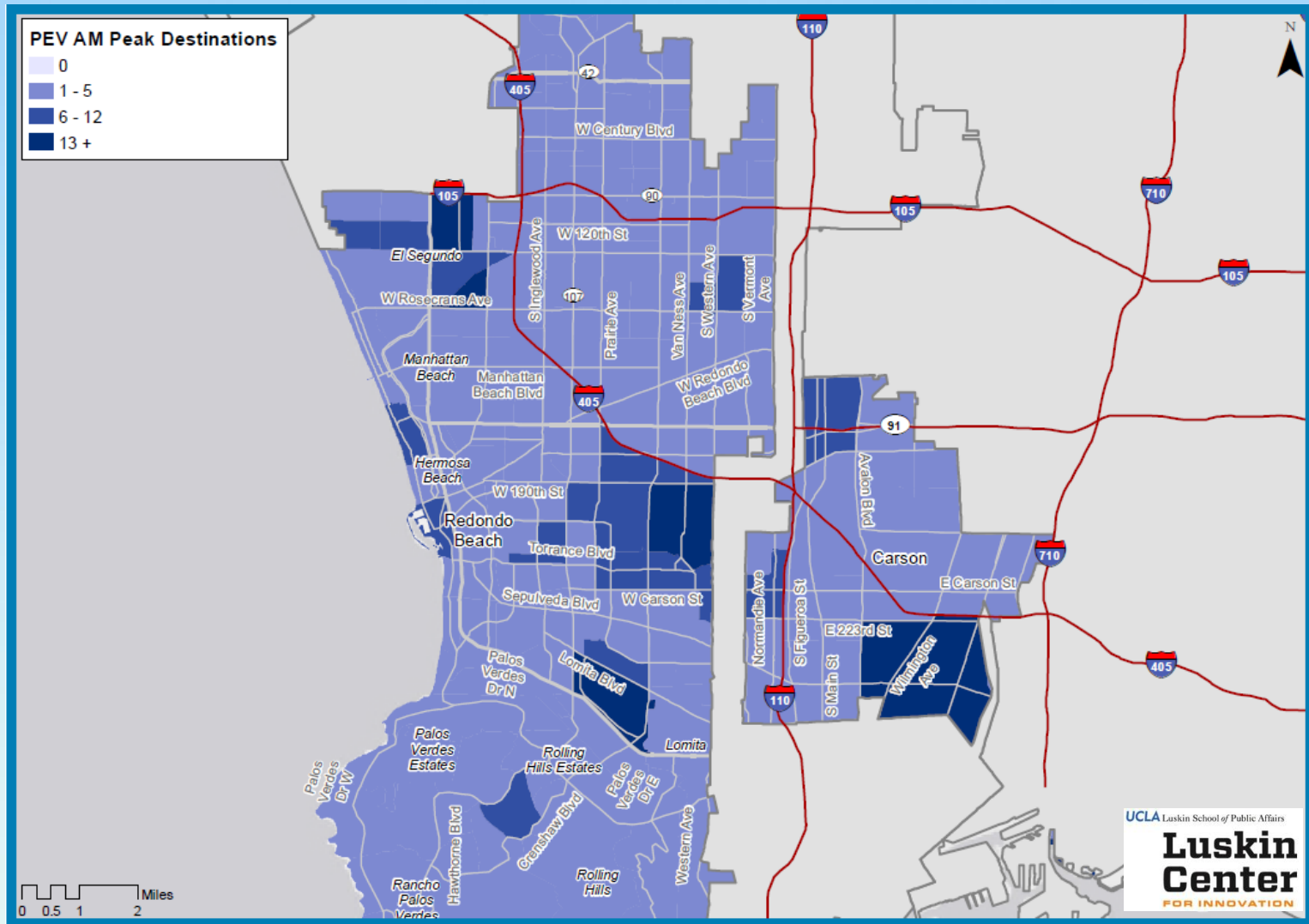


* The +5% and +10% projections begin in 2014, when uncertainty becomes greater.

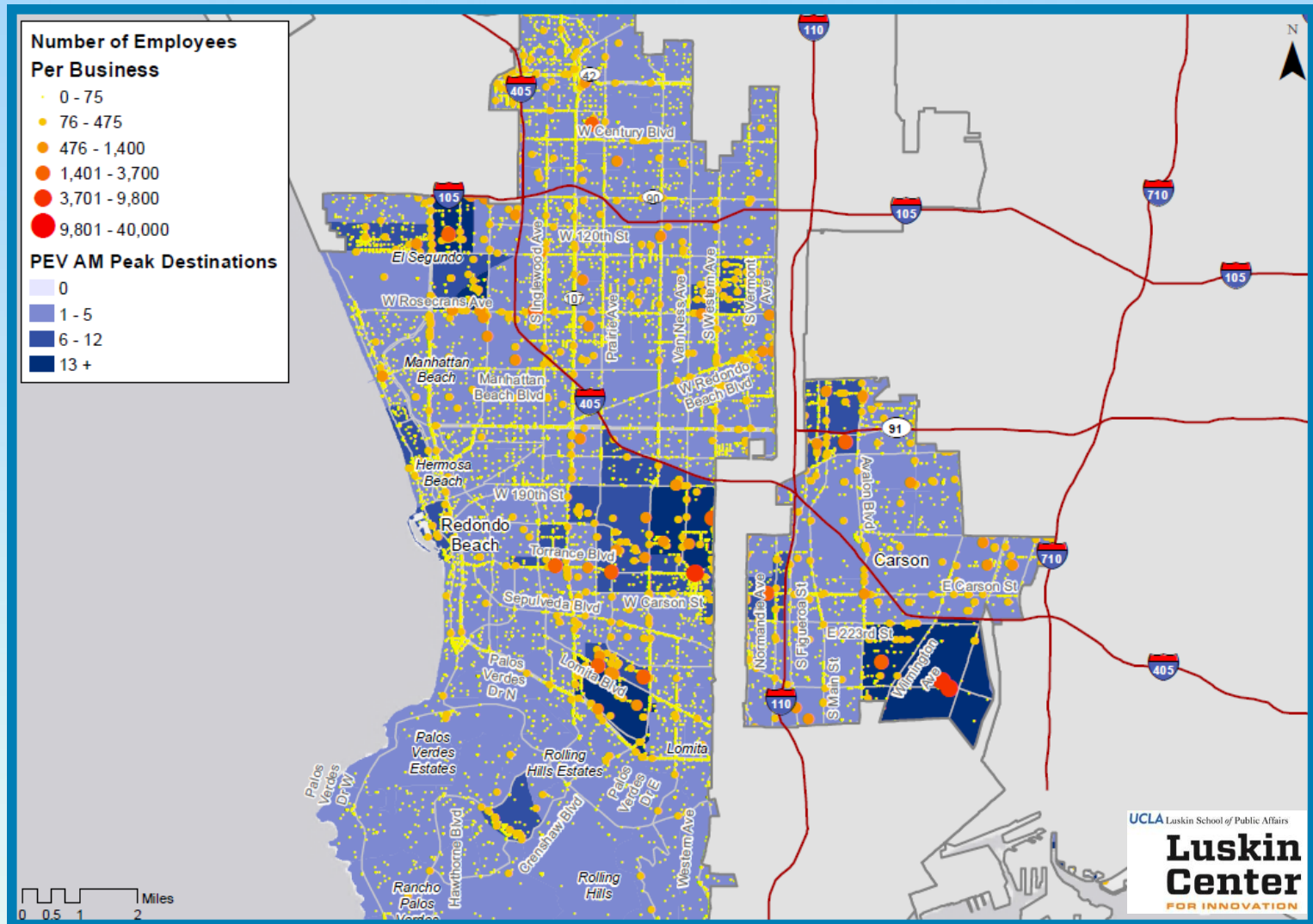
PEV Registrations by TAZ (Polk Registration Data)



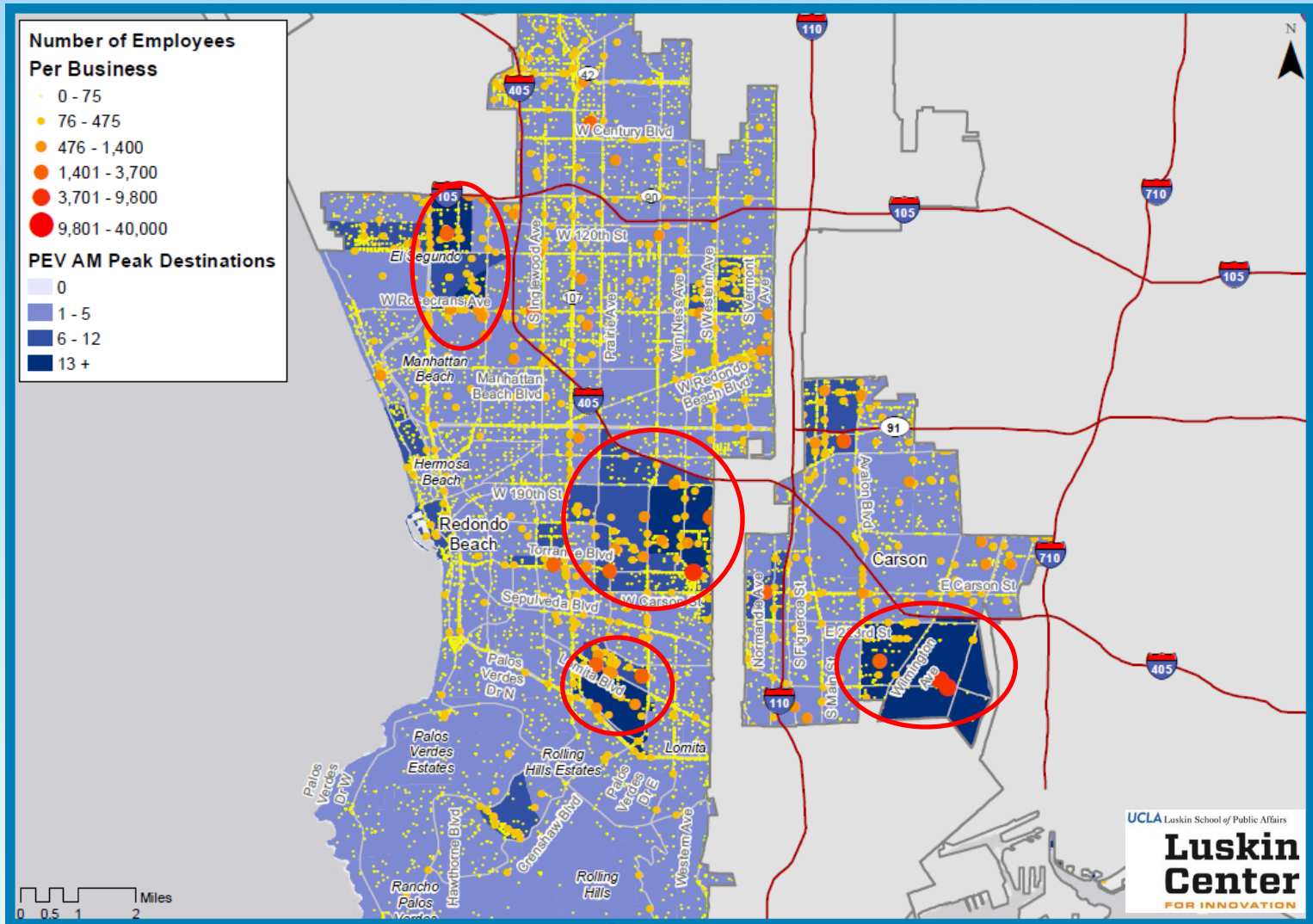
PEV Morning Peak Destinations (SCAG Transportation Model)



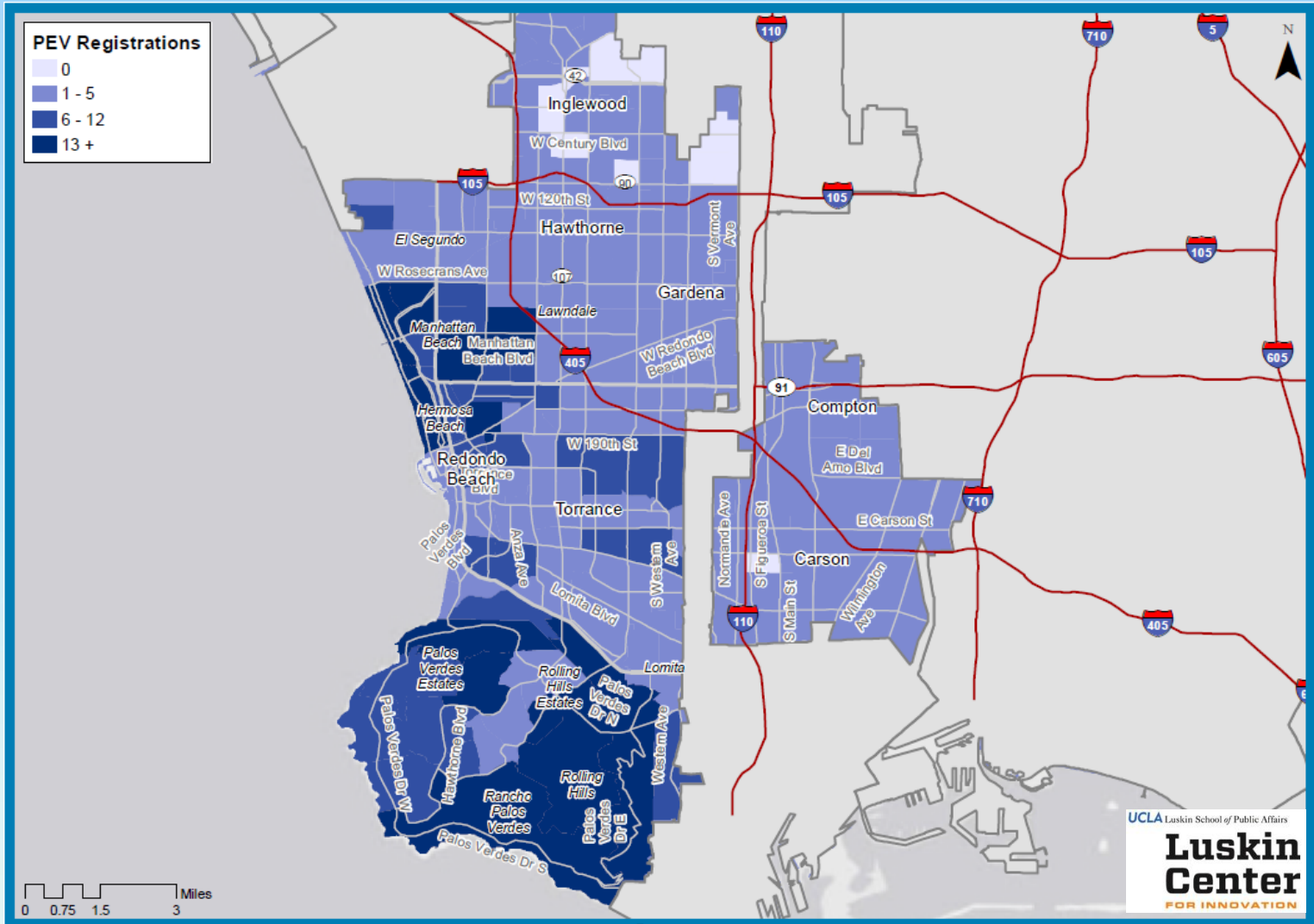
PEV Morning Peak Destinations and Workplaces by Number of Employees



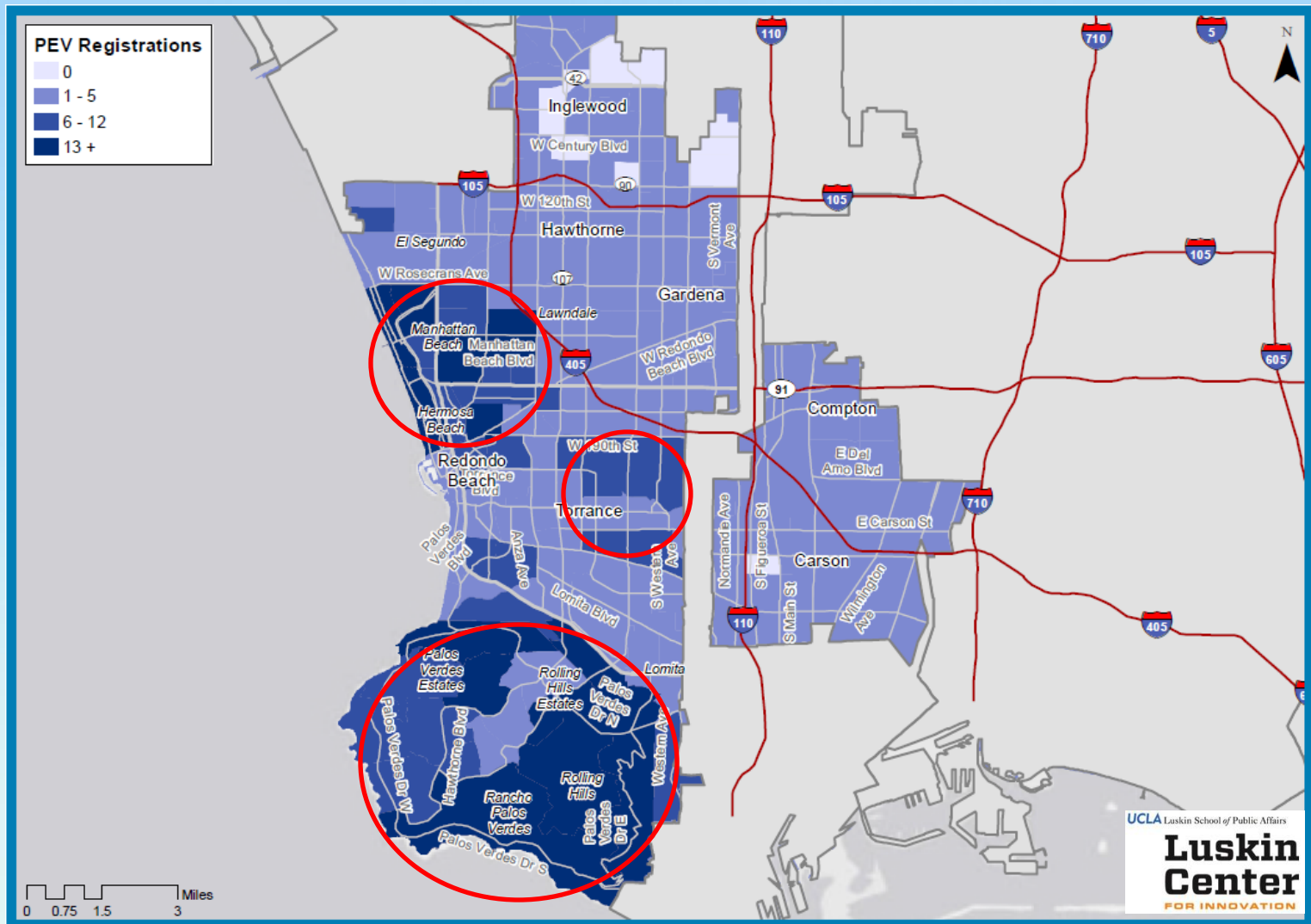
PEV Morning Peak Destinations, Workplaces, and Employment Clusters



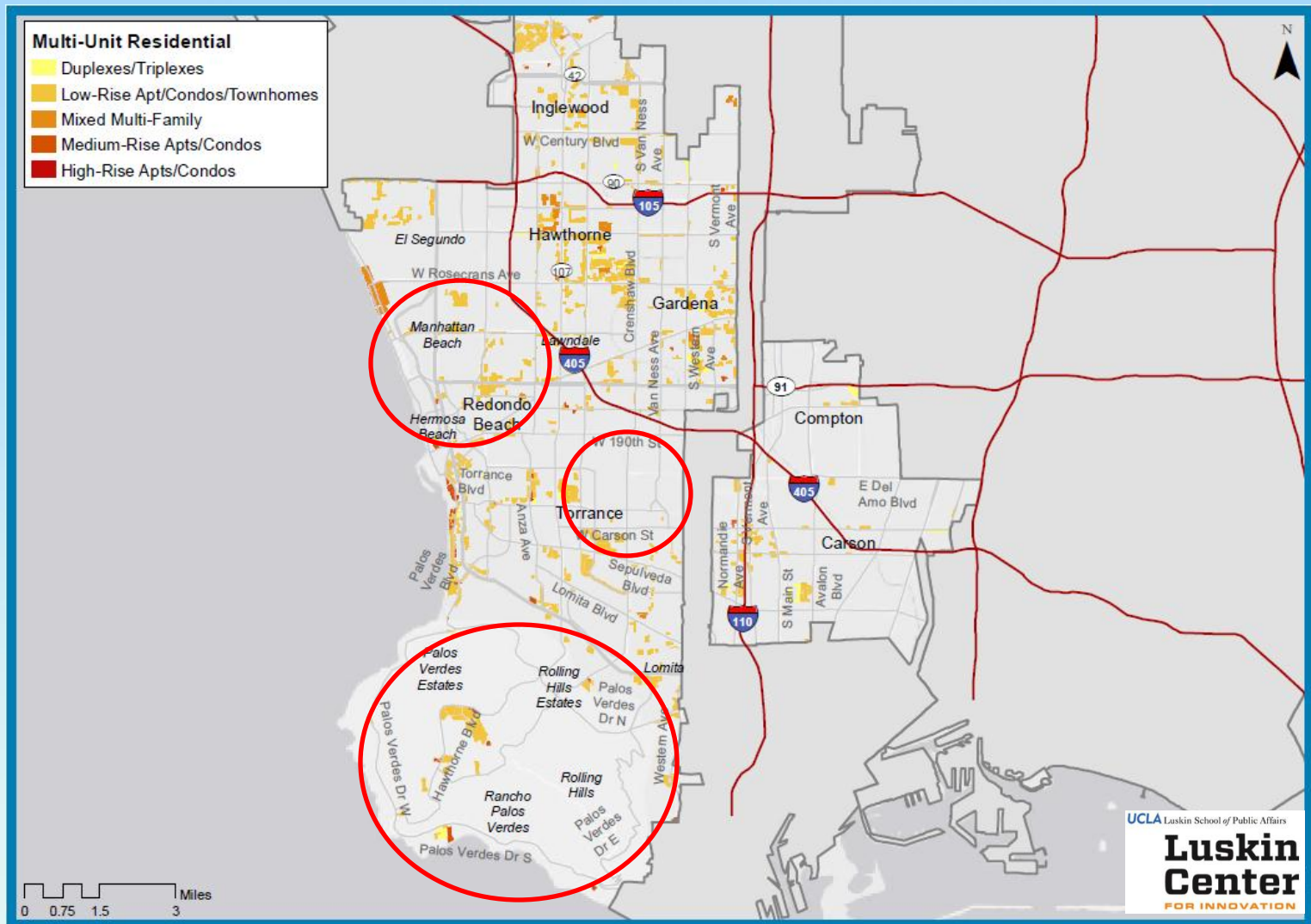
PEV Registrations by TAZ



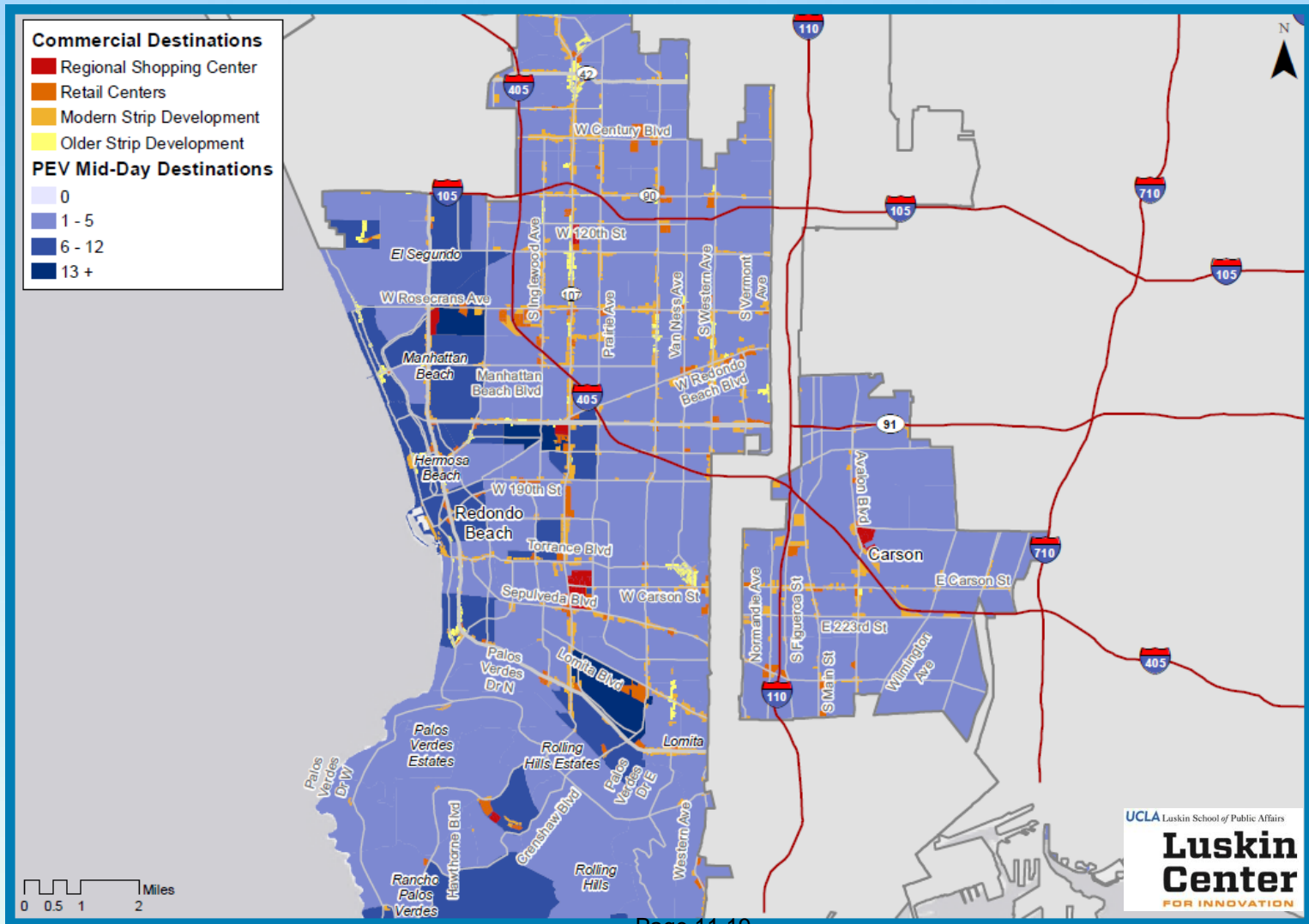
PEV Registrations by TAZ and Residential Clusters



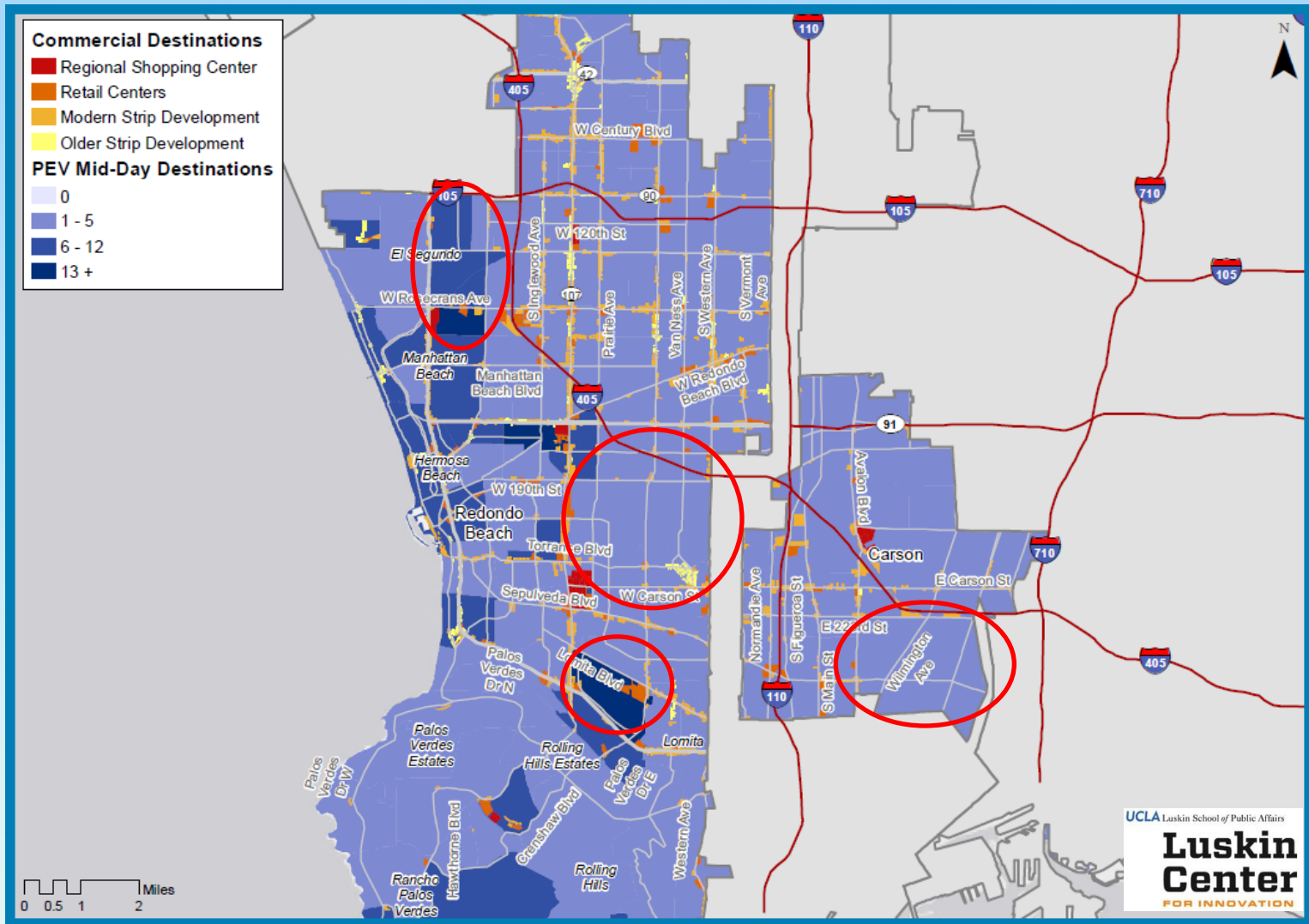
Multi-Unit Residential Dwelling by Type and Residential Clusters



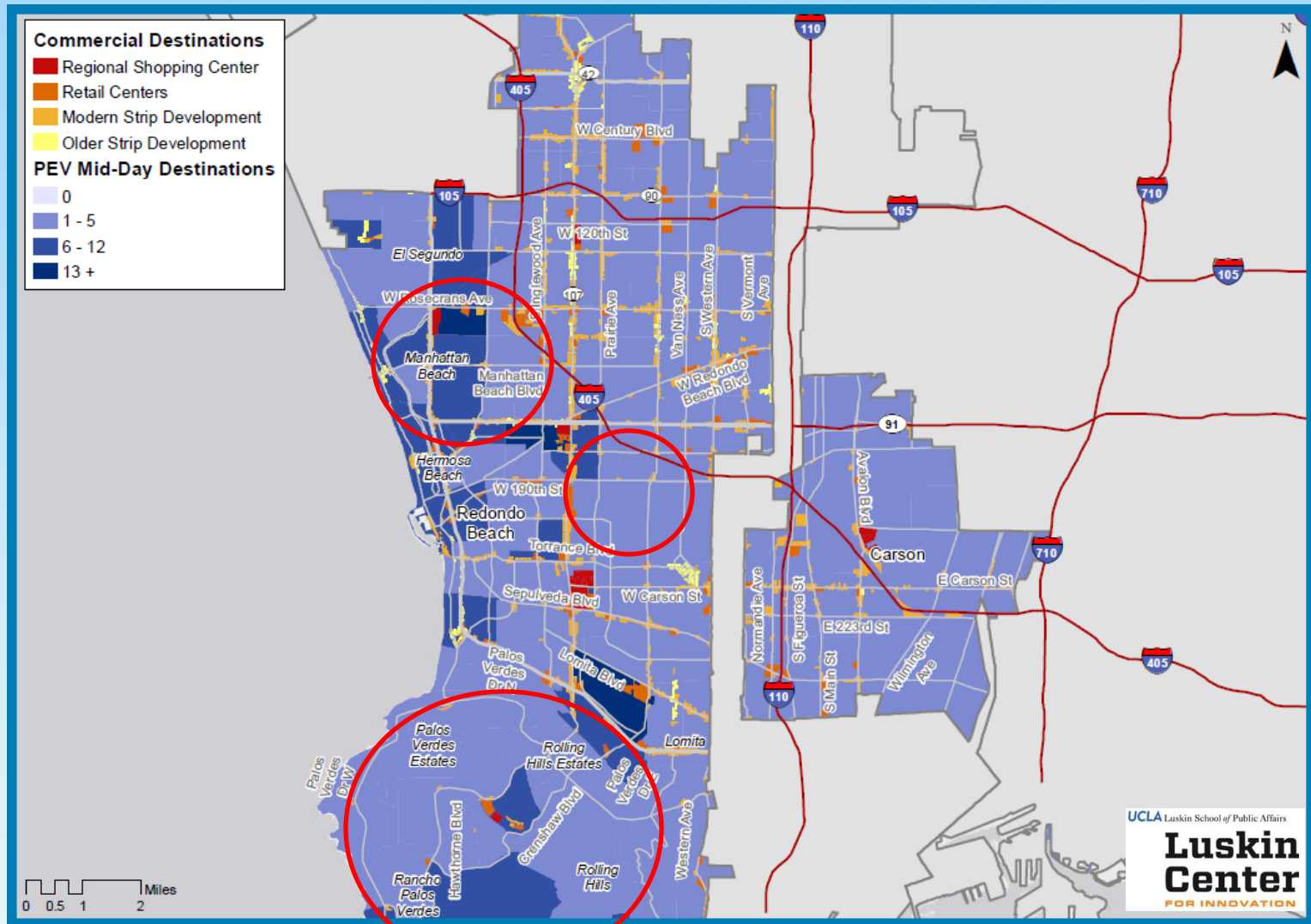
PEV Mid-Day Destinations and Retail Locations



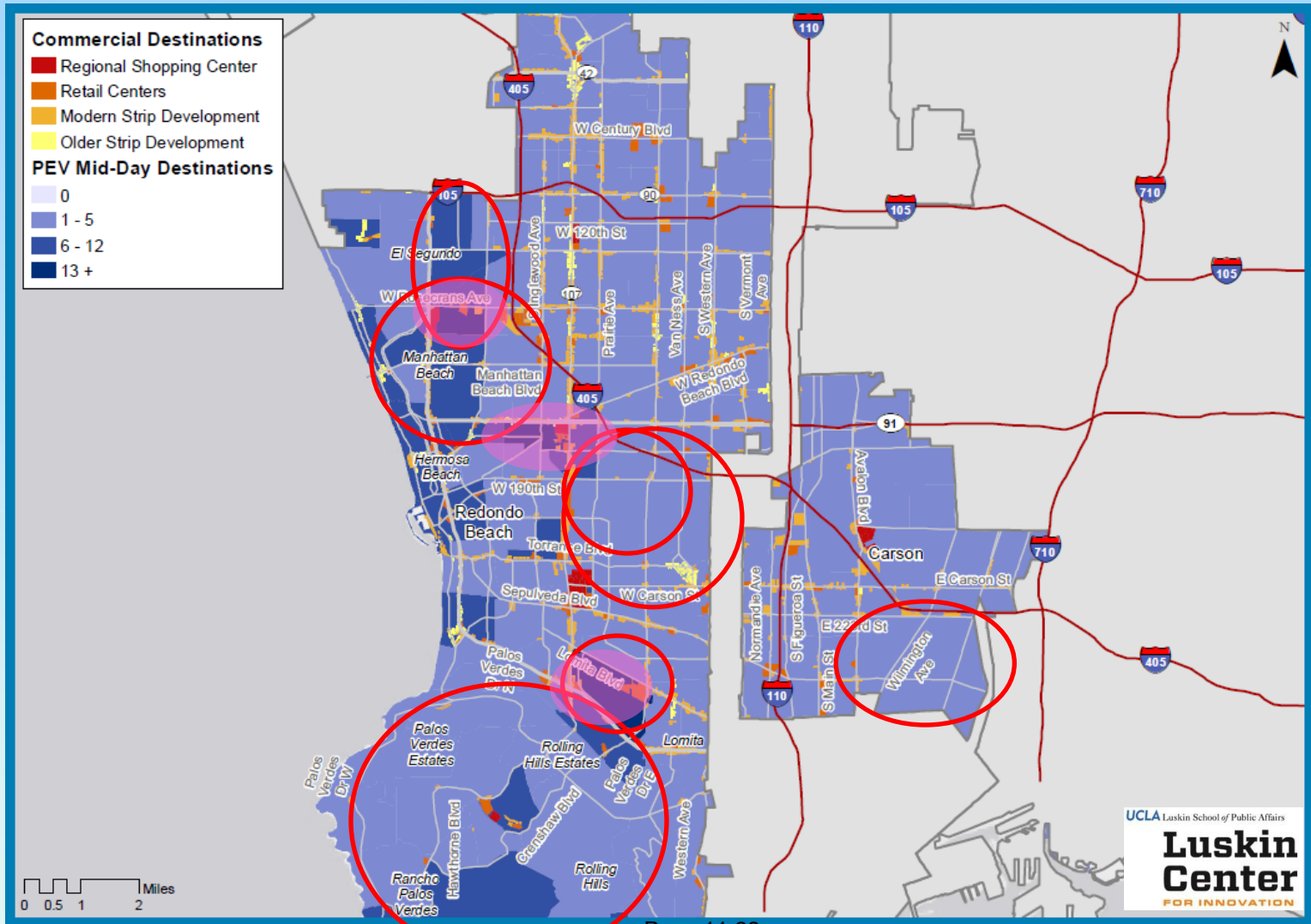
PEV Mid-Day Destinations, Retail Locations, and Employment Clusters



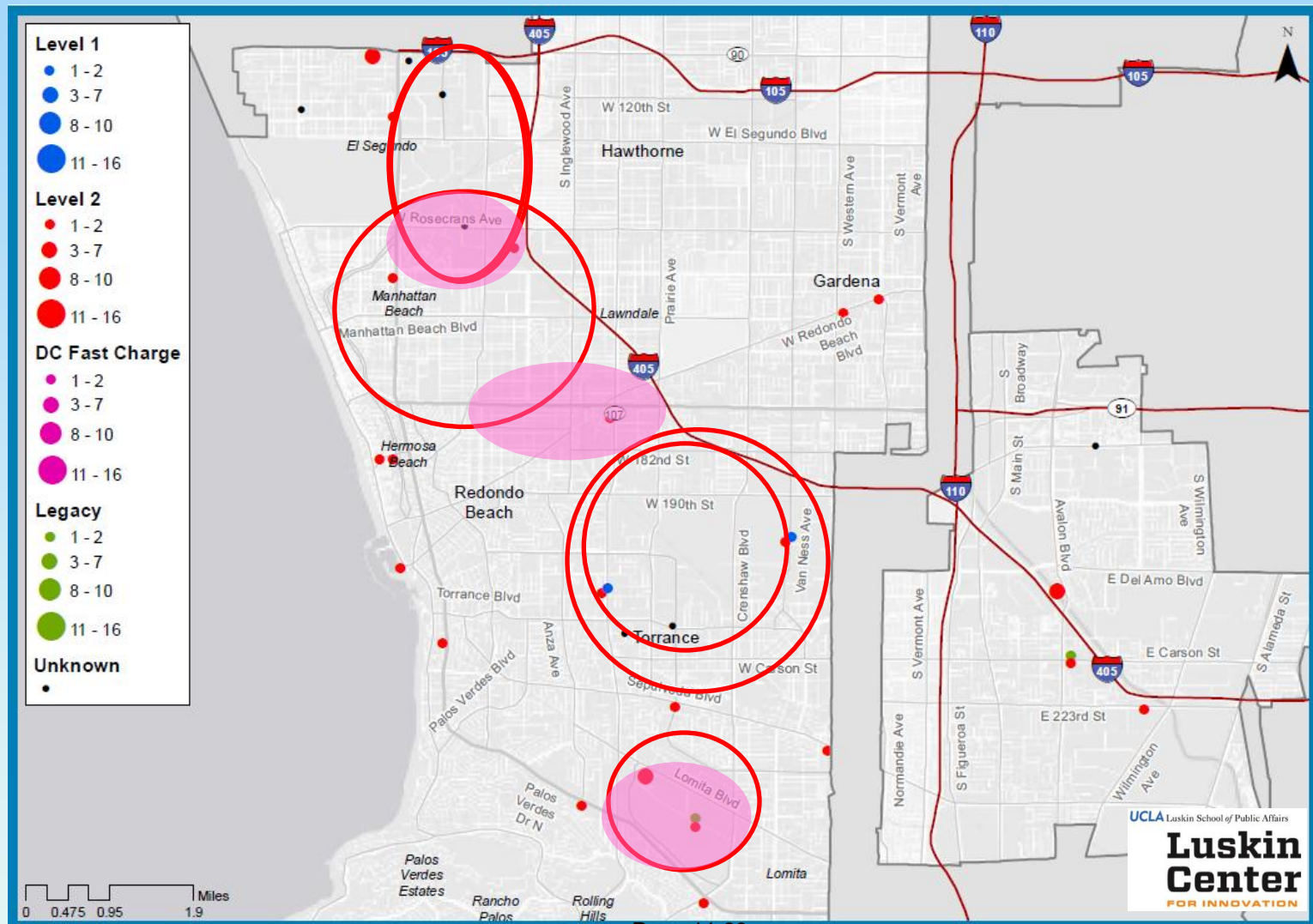
PEV Mid-Day Destinations, Retail Locations, and Residential Clusters



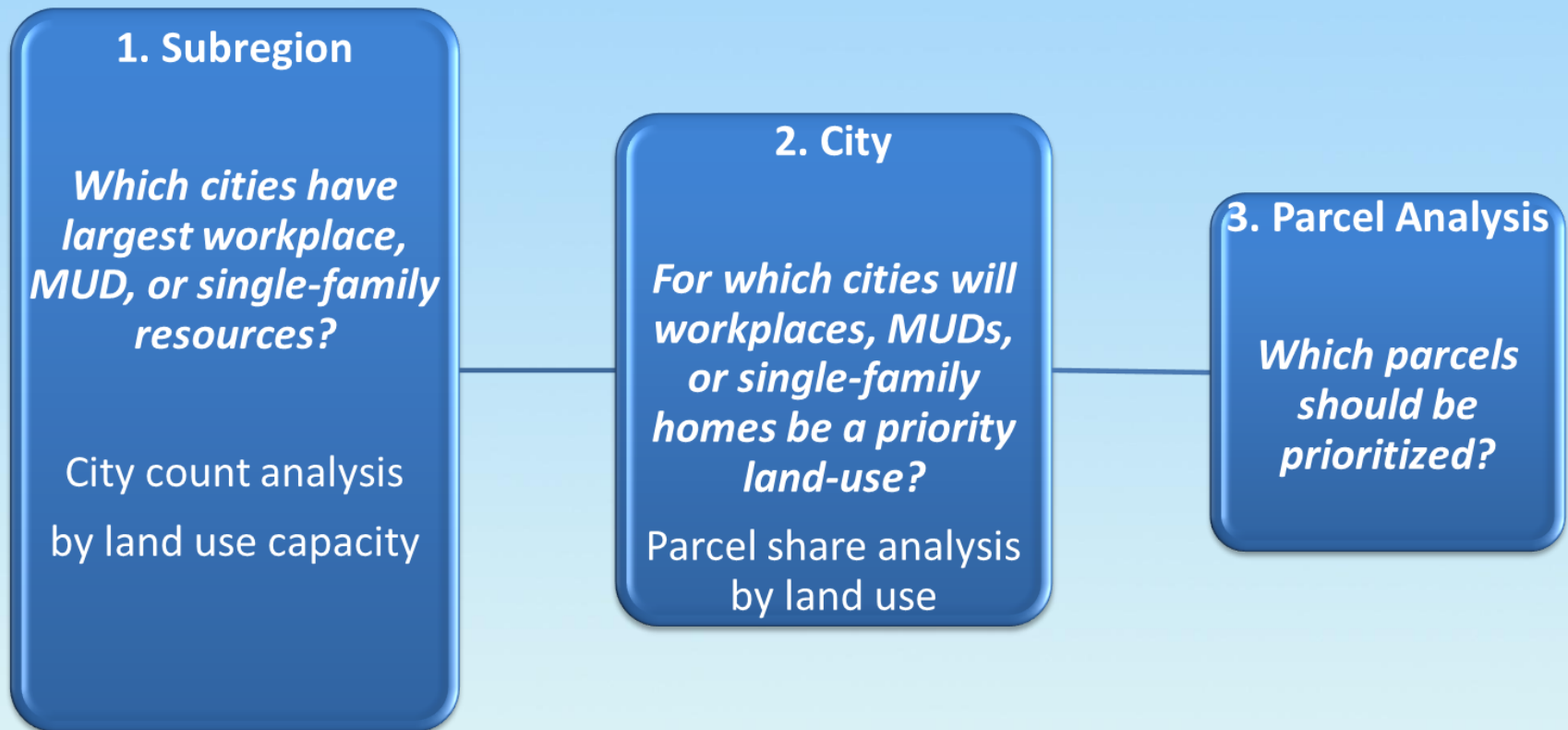
PEV Mid-Day Destinations, Retail Locations, Target Areas



Publicly Accessible Charging Stations (Summer/Fall 2012)



Levels of PEV Planning in Subregional PEV Deployment Plans



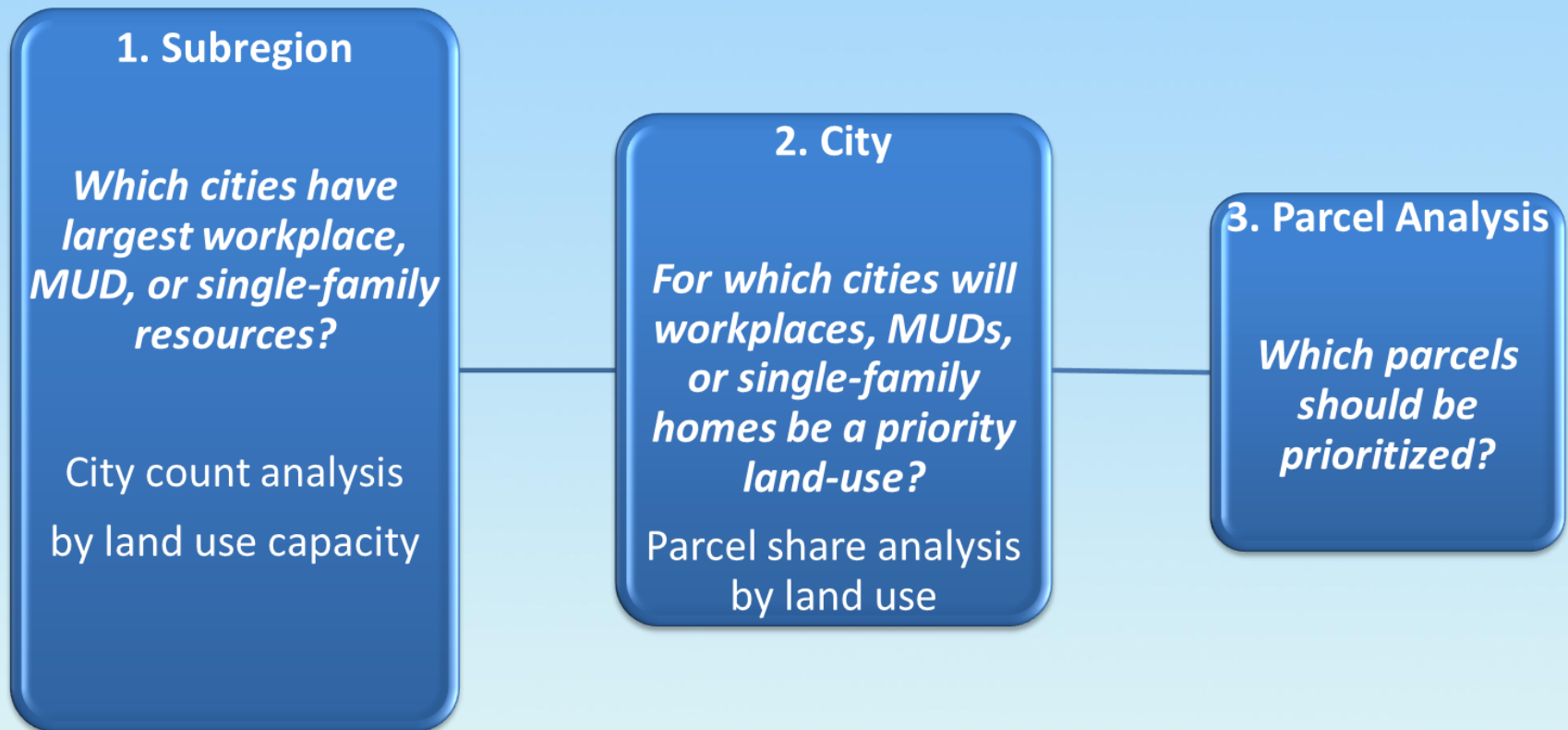
Estimated parking spaces, employment land use, South Bay Cities

	Employee Count	MUD Count	Single-Family Count
Torrance	97,325	22,709	35,771
El Segundo	61,492	3,721	3,582
Carson	49,776	2,920	22,935
Inglewood	28,604	21,117	18,192
Gardena	24,951	9,427	12,944
Redondo Beach	23,471	14,175	16,091
Hawthorne	19,411	19,689	10,345
Manhattan Beach	17,139	3,215	12,044
Hermosa Beach	5,865	5,080	5,401
Lawndale	5,783	3,170	7,419
Rancho Palos Verdes	4,713	2,340	13,452
Rolling Hills Estates	4,268	156	2,928
Lomita	3,096	2,695	5,383
Palos Verdes Estates	2,028	356	4,922
Rolling Hills	237	0	689

Estimated parking spaces by employee *share*, South Bay Cities

	% Employee	% MUD	% Single-Family
El Segundo	89%	5%	5%
Carson	66%	4%	30%
Torrance	62%	15%	23%
Rolling Hills Estates	58%	2%	40%
Manhattan Beach	53%	10%	37%
Gardena	53%	20%	27%
Redondo Beach	44%	26%	30%
Inglewood	42%	31%	27%
Hawthorne	39%	40%	21%
Hermosa Beach	36%	31%	33%
Lawndale	35%	19%	45%
Palos Verdes Estates	28%	5%	67%
Lomita	28%	24%	48%
Rolling Hills	26%	0%	74%
Rancho Palos Verdes	23%	11%	66%

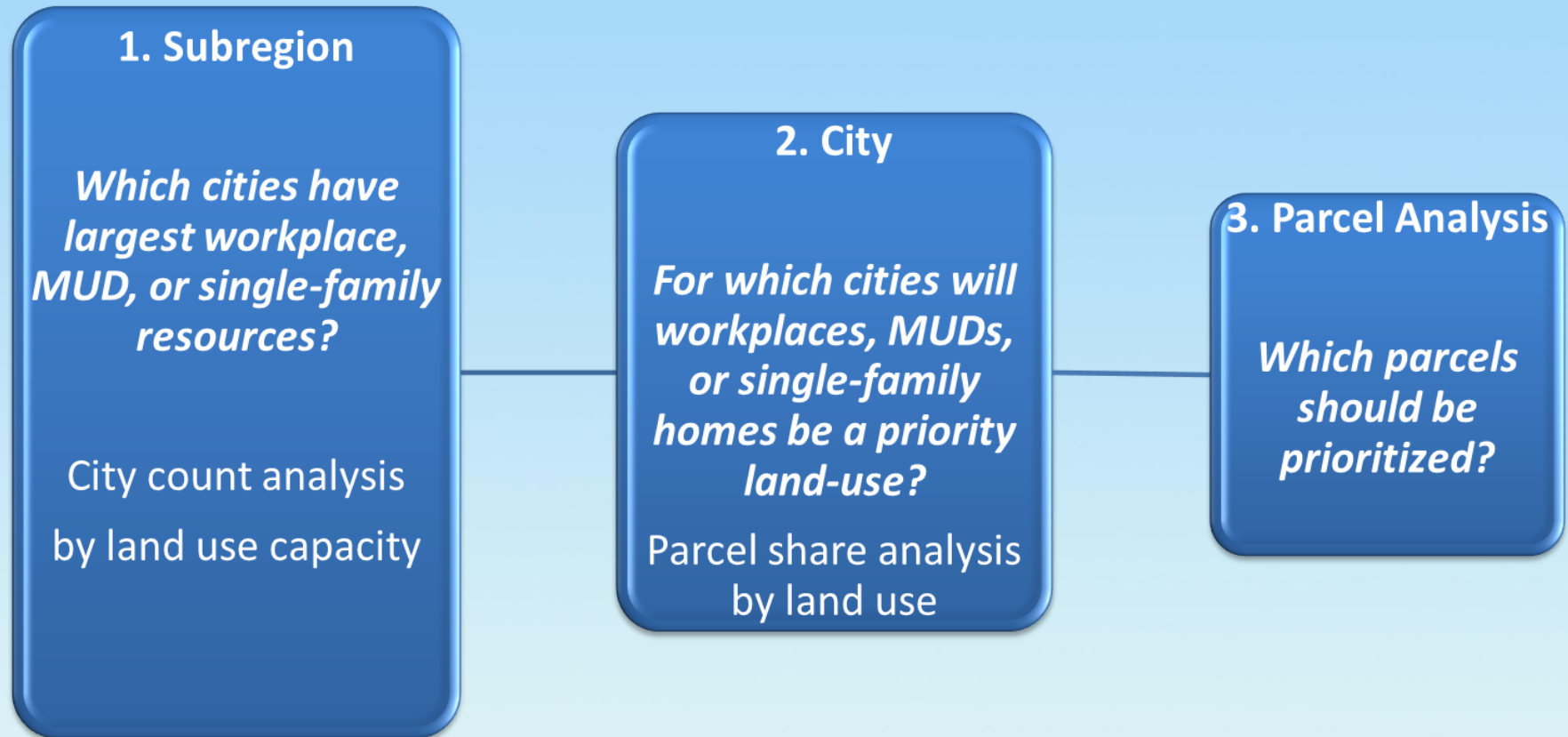
Levels of PEV Planning in Subregional PEV Deployment Plans



Largest workplaces, high PEV density TAZs, weekday mornings, South Bay Cities subregion

Company	Address	City	Employees	High Tech	White Collar
Boeing Satellite Systems	1950 E Imperial Hwy	El Segundo	4,899	Y	Y
Torrance Memorial Medical Center	3330 Lomita Blvd	Torrance	3,018	N	Y
Aero Space Corp	2350 E El Segundo Blvd	El Segundo	2,820	Y*	Y*
Directv Inc	2230 East Imperial Highway	El Segundo	1,823	Y	Y
Mattel Inc	333 Continental Blvd	El Segundo	1,609	N	Y*
American Honda Motor Co	1919 Torrance Blvd	Torrance	1,602	N	Y
Space Exploration Technologies	1 Rocket Road	Hawthorne	1,186	Y*	Y*
BP-Arco	2350 E 223rd St	Carson	1,075		
Robinson Helicopter Co Inc	2901-31 Airport Dr	Torrance	961	Y	Y
Herbalife International of America	950 190th St	Torrance	939	N	Y
Hi-Shear Corporation	2600 Skypark Dr	Torrance	865	N	N
Rhythm & Hues, Inc	2100 E Grand Ave	El Segundo	704		N
L-3 Communications Electron Tech Inc	3100 W Lomita Blvd	Torrance	621	Y	Y
Moog, Inc	20263 S Western Ave	Torrance	445	Y	Y
Leiner Health Products	901 E 233rd St	Carson	381		
Virco Mfg Corp	2027 Harpers Blvd	Torrance	372	N	N
Teledyne Controls	501 Continental Blvd	El Segundo	371	Y*	N
Costco Wholesale	2751 Skypark Dr	Torrance	368	N	N*
Wal-Mart	19503 S Normandie Ave	Torrance	338	N*	N*
R. R. Donnelley & Sons Co	19681 Pacific Gateway Dr	Torrance	337		
Huck Intl Inc. DBA Alcoa Fastening Sys.	900 Watson Center Rd	Carson	331		

Levels of PEV Planning in Subregional PEV Deployment Plans

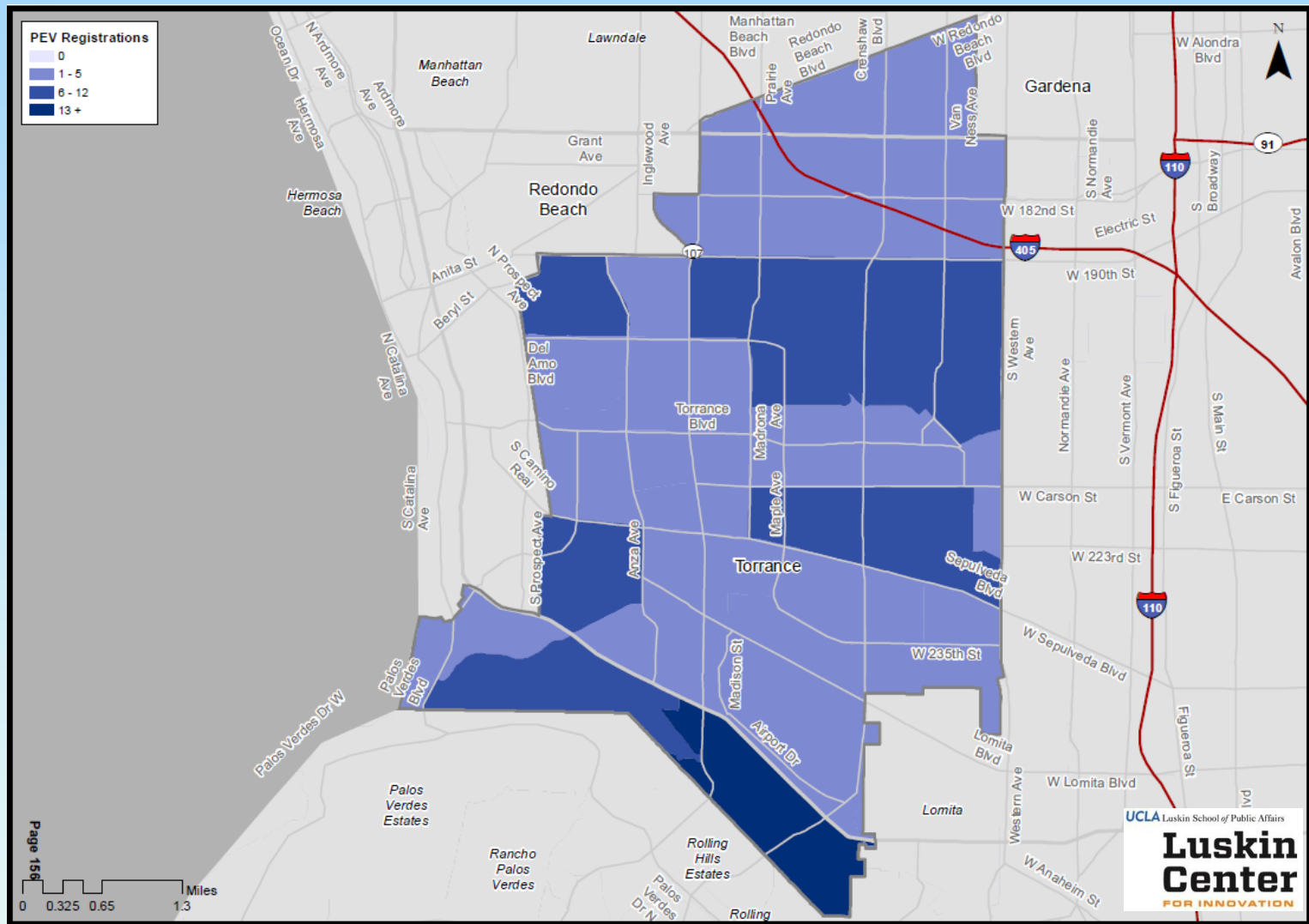


MUNICIPAL PEV PLANNING

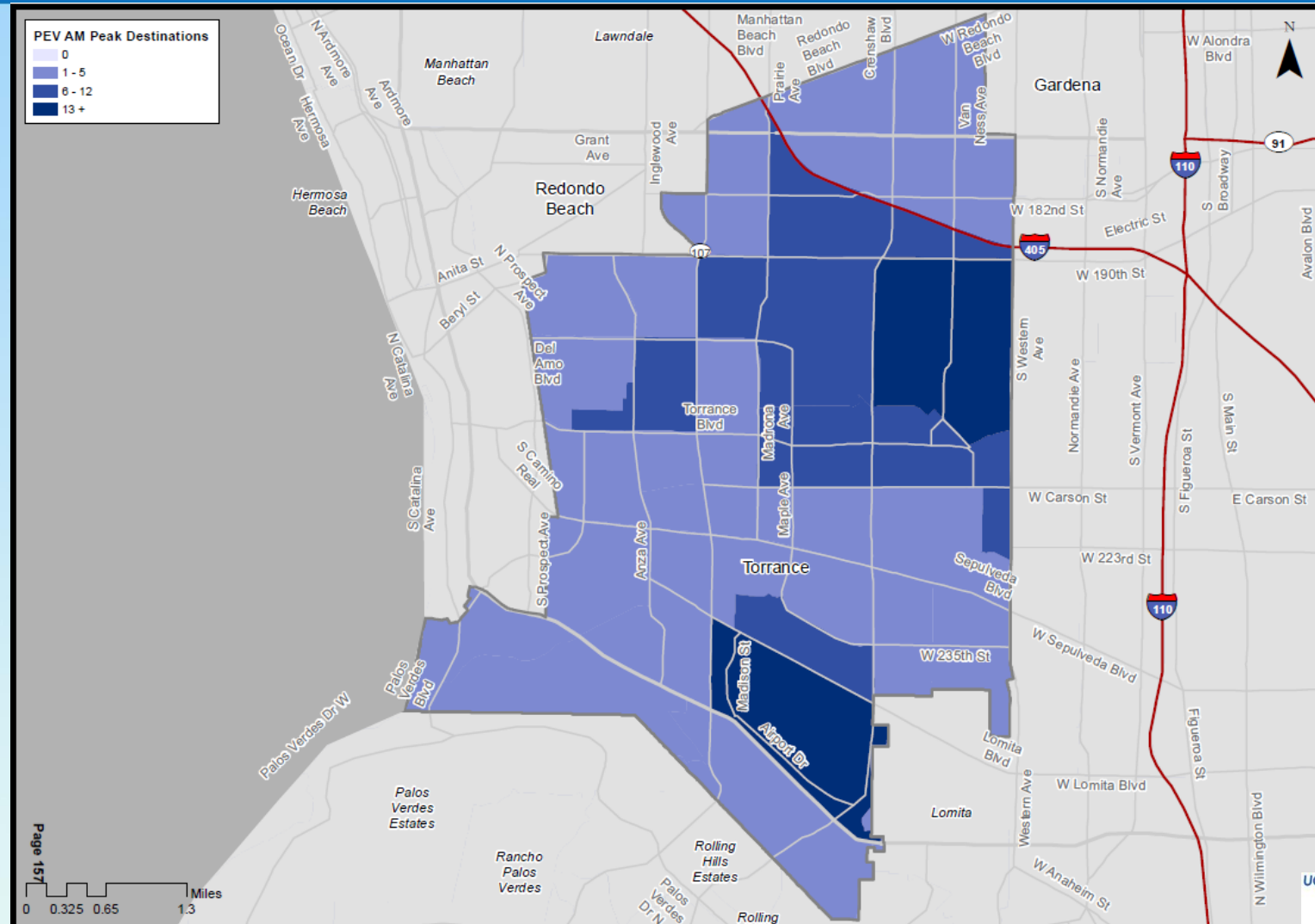
Torrance Example

- Location of PEV Registrations
- PEV morning peak destinations (map)
- Top workplaces by number of employees
- PEV morning peak destinations and top workplaces
- **Top employers (table)**
- Multi-unit residential and PEV registrations
- **Top MUDs (table)**
- Commercial (retail) locations
- PEV mid-day destinations and commercial (retail) locations
- **Top retailers (table)**
- Publicly-accessible charging stations

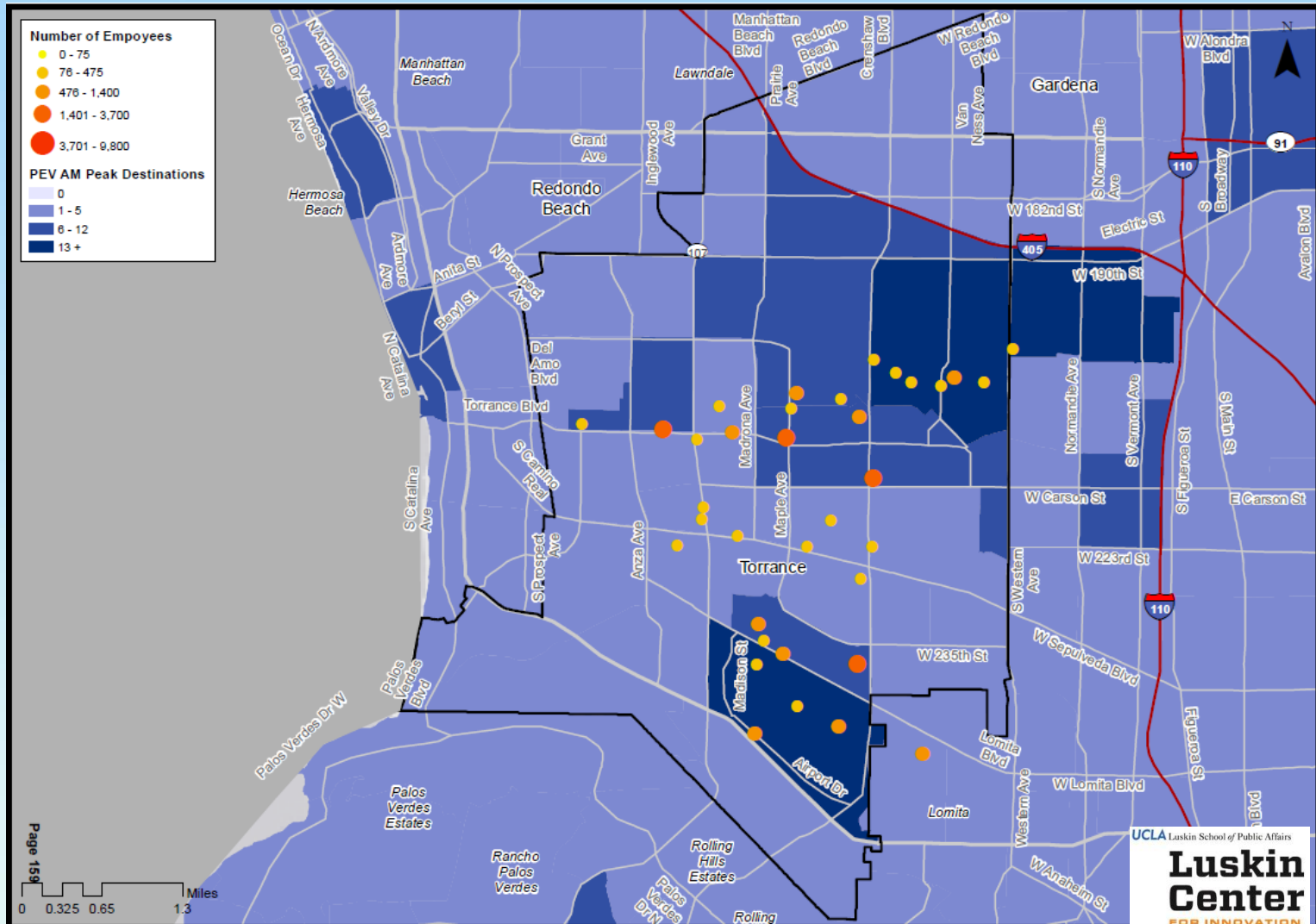
PEV Registrations, Torrance (Polk Registration Data)



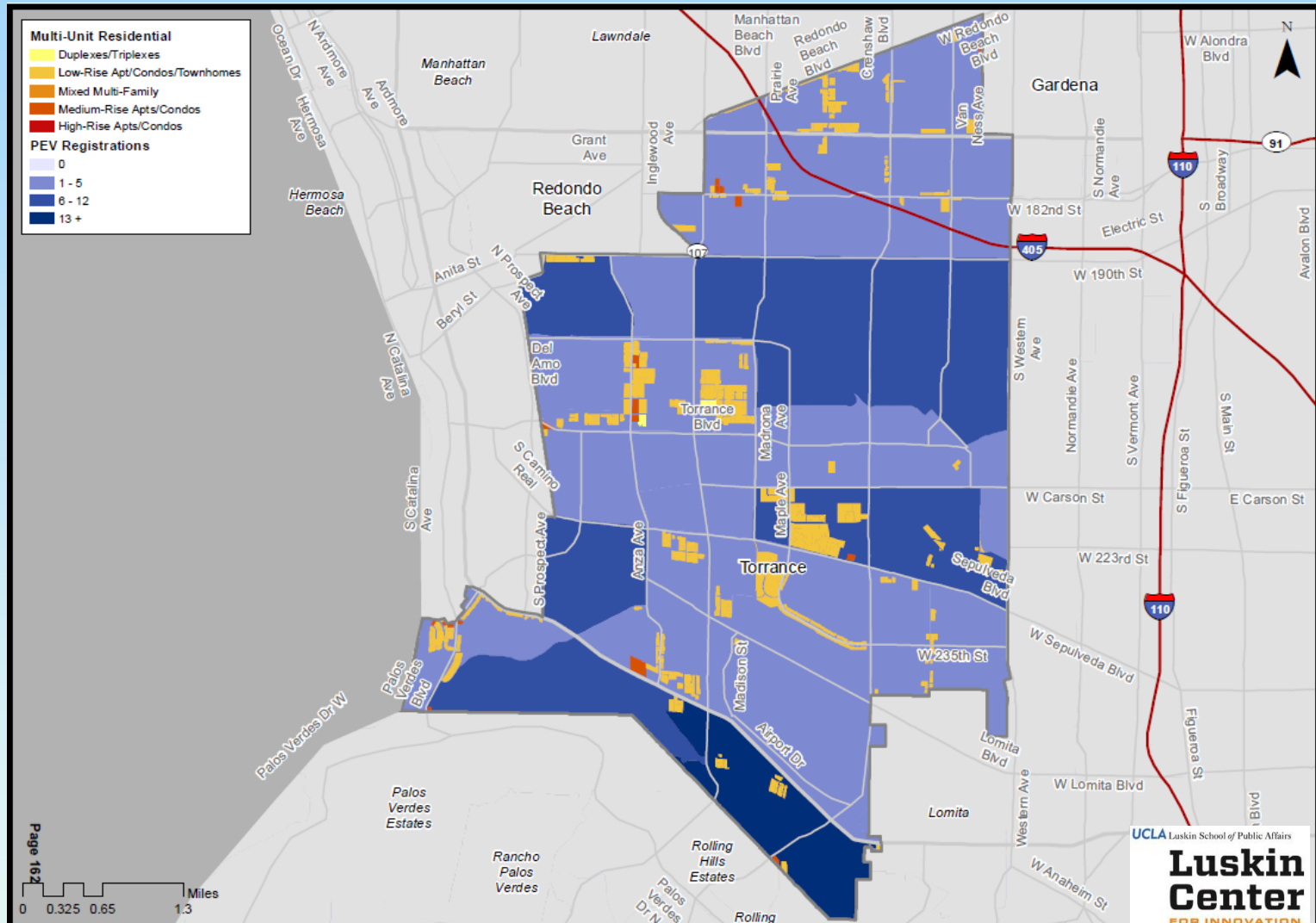
PEV Morning Peak Destinations, Torrance (SCAG Transportation Model)



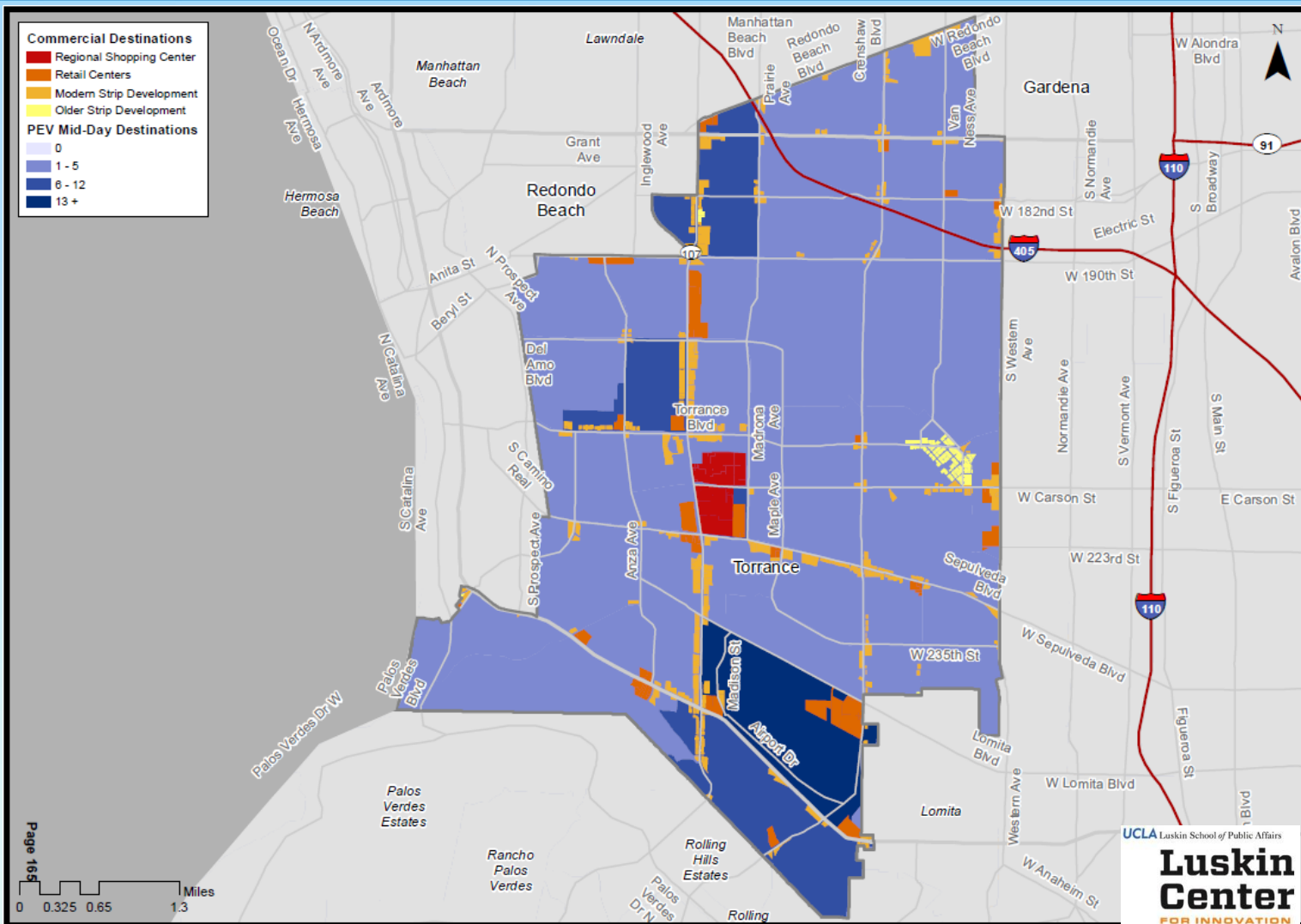
Top Ranked Employers and PEV Morning Peak Destinations, Torrance



Multi-Unit Residential and PEV Registrations, Torrance



Retail Locations and PEV Mid-Day Destinations, Torrance



Next Steps

- Complete Subregional Deployment Plans (November 2013)
- Promote Plans at 2013 Alt Car Expo
- Discuss Subregional PEV Plans at all member COGs
- Continue partnering with SCAQMD
- Continue hosting bi-monthly So Cal PEVCC meetings

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